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ABSTRACT

Interest in the relationship between student characteristics and interests and economics grades led to the administration of a questionnaire to 565 students enrolled in principles of economics classes. The students who completed the questionnaire were among 1,000 students in 27 sections of macro and micro principles courses at Southeast Missouri State University. Regression analysis indicated that sex and major had little to do with semester grade in economics but that students with higher grade point averages and with more positive attitudes towards economics got higher grades in economics. Completion of accounting, computer science, college algebra, and government classes was also associated with higher grades in economics. (IS)

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DETERMINANTS OF GRADES IN ECONOMICS

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Paper presented at the Annual Meeting of the Midwest Economics Association (47th, St. Louis, MO, April 7-9, 1983).

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I. Introduction

The curriculum in most departments of economics (as well as that of many other departments) at the university level is a result of custom and expediency with a smattering of planning thrown in. Several questions about the principles course are used as ice-breakers whenever economists gather. What is the appropriate level for the principles courses? Should beginning freshmen be allowed to enroll in principles courses? Should the principles courses be sequenced? If so, which comes first, macro or micro?

The concern with these questions may not be unique to economists as a discipline. There are some characteristics of the field, however, which are somewhat unique. One is that the study of economics uses a wider variety of approaches than most subject areas. Economics requires a student to have strong verbal skills, to use some mathematics, to work with graphs, and to follow a chain of logical reasoning, all on the same page of a text or within a few minutes of a lecture. Another somewhat unique characteristic of the study of economics is the appallingly small percent of college students who have had previous exposure to the subject.

This paper is designed to help those who are involved in work on curriculum revision and development in economics departments. The author recognizes that curriculum change must take into account both campus politics and the need for maintaining student enrollment. However, information gained from this research may help in weighing

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the costs and benefits of various proposals for changing the curriculum.

Section II of this paper describes a questionnaire which was administered to macro and micro principles students. Results from the survey are discussed in Section III which examines the relationships between these factors and the grade received in economic principles. Section V summarizes the results and poses some suggestions for further study.

II. Method

A questionnaire was distributed to all students in macro and micro principles during the fall semester at Southeast Missouri State University. (See Appendix 1.) There were twenty-seven sections being taught by ten different faculty members. The maximum possible sample size was approximately 1000, but assuming a ten percent absentecism rate, this drops to 900. Not only was participation in the survey voluntary, but students who chose to participate had to sign a statement allowing their instructor to give me their final grade at the end of the semester. About 565 questionnaires were completed, resulting in a participation rate of about 63%. Of the 565 completed questionnaires, about 75 were not used, due to incomplete information, or obvious errors in filling out the computer answer sheet.

All sections are taught using the same traditional type of textbook. No common exams are given, and, while a short course syllabus or outline is available for both macro and micro, agreement on topics to be included, other than the very basic ones, is informal. The ten faculty members who participated included the

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entire department, which is rather diverse: three women, one naturalized citizen of Korean descent, one naturalized citizen of Nigerian descent, and five white males. Age of faculty ranged from under 30 to over 60. No attempt was made to distinguish among students of particular teachers.

Information collected from the questionnaire included: age, sex, total college hours completed, over-all grade point average, and whether or not the student was an economics or business major. In addition, a list of courses which might improve the students' understanding of economics was included. Students were asked which of these courses they had taken, either previously or concurrently with the principles class. Finally, students were asked a few questions about their attitude toward the subject of economics. The answers to these questions were used to construct an index of interest in economics.

III. Student Profiles

Some information concerning principles students was gained which is not directly related to grades in economics. Correlation coefficients, for both macro and micro principles students, are show in Table 1. Factors, included sex, major, age, attitude toward economics, hours completed, and overall grade point average.

Sex was coded as "1" for males and as "2" for females. Major was coded as "1" for business or economics majors and as "2" for others. College hours were divided into four categories, ranging from 0 to 30, 31-60, 61-90, and over 90. Age was divided into categories of under 19, 19-20, 21-22, 23-30 and over 30. Grade

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Table 1
Student Variables

Macro

	Sex	Major	Hours	Age	GPA
Major	-0.040				
Hours	0.074	-0.006			
Age	-0.014	0.059	0.525		
GPA	0.112	0.029	0.660	0.416	
Attitude	0.179	0.153	-0.171	-0.171	-0.116

Micro

	Sex	Major	Hours	Age	GPA
Major	-0.056				
Hours	0.095	-0.259			
Age	-0.013	-0.243	0.657		
GPA	0.158	-0.216	0.600	0.440	
Attitude	0.208	0.024	0.017	-0.048	-0.175

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point average ranged from 0-1.5, 1.5-2.25, 2.25-3 and over 3. The attitudes score ranges from one to fifteen, with a higher score indicating a dislike of and/or difficulty with economics. This score was computed by adding the scores on question 6, 7, and 8, and then subtracting the score on question 10. Question 9, "Compared to other subjects, I find economics to be difficult but interesting," was not included in computing the attitudes score, as virtually no student agreed with it.

The results are similar for micro and macro students. The correlation coefficients for both types of students indicate more business and economics majors with more hours completed and with higher grade point averages. Females have higher grade point averages as do students who are older or who have completed more hours. Attitude toward economics seems to vary with grade point, with higher grade point average related to a more positive attitude toward economics. Finally, females seem to have a greater dislike for economics than do males.

Chi square statistics were computed for both macro and micro students for those variables with correlation coefficients over .1 in order to more closely examine these relationships, the results indicate a significantly more positive attitude (.95 level) toward economics for males in both macro and micro, with a chi square of 8.77 and 10.36, respectively, both with 2 degrees of freedom. Business and economics majors had a more positive attitude (chi-squares of 5.52 and 4.22, 4 degrees of freedom), although the level of significance was only about .7. The differences in age

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as related to attitude were significant at only about a .5 level (8.81 and 5.43, 8 degrees of freedom). Those with higher grade point averages had a much more positive attitude, with chi squares of 16.26 and 16.08, 8 degrees of freedom, which is significant at the .95 level. Females had higher over-all grade point averages than did males, with chi squares of 8.18 and 7.38, 4 degrees of freedom, and a significance level of .92 and .85, respectively.

These factors must be kept in mind when interpreting the results described in Section IV. There are a wide variety of factors which influence grades received in economics.

IV. Grades

Correlation coefficients for the relationships between student variables and grades are shown for both macro and micro principles in Table 2. A grade of A was coded as "1", B as "2" through F as "5".

These results are not surprising. While sex and major seem to have little to do with the semester grade in economics, students with more college hours completed, students who are older, students with higher grade point averages, and students with a more positive attitude about economics get higher grades in economics. The minus sign on the GPA/grade coefficient actually indicates a positive relationship between the two, as a low GPA was coded as "1" while an A grade was also coded as "1".

Table 3 contains correlation coefficients for grades in economics in relation to other classes taken, either previously or concurrently. All classes are at the introductory level, with the exception of

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Table 2
Student Variables and Grades

	Macro	Micro
Sex	.009	.060
Major	.070	.078
Hours	-.241	-0.202
Age	-.162	-0.133
GPA	-.369	-0.356
Attitude	.347	0.187

Table 3

Class	Macro	Micro
Accounting	.125	.173
Computer Science	.257	.128
Micro/Macro	-.001	.190
English Composition	.141	.146
Intermediate Algebra	.034	-.066
College Algebra	.240	.132
Management	.070	.064
Marketing	.019	.033
Logic	-.013	.012
Government	.143	.174
American History	.154	.026

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college algebra which is one "step above" intermediate algebra. Having previously taken a course was coded as "1", taking a course concurrently was coded "2", and not having had the course at all as "3". Thus a positive correlation indicates that taking the course is related to a higher grade in economics.

The economist might quickly notice that while having taken macro principles seems to be related to a better grade in economics, only a very small relationship exists between having taken micro and grade received in macro. The principles classes at Southeast Missouri are numbered 110 for macro and 120 for micro. While 110 is not listed as a prerequisite for 120, that is by far, the normal order in which they are taken. Only 18 macro students had taken micro, thus providing too small a sample to come to any valid conclusions. The same is true for logic, with only 14 students in macro and 19 in micro having taken it.

The courses which have correlation coefficients of .10 or more with grades seem to fall into two broad categories: those dealing with abstract or logical reasoning and those which provide background material or skills. In the first category, accounting, computer science, and college algebra are all areas which require some practice of logical thought. Although this is true, too, of Intermediate Algebra, students who enroll in it tend to have had mediocre mathematical backgrounds, and are likely to lack experience with abstract reasoning.

Courses which may contribute to higher grades because of the provision of background material or skills include English Composition,

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American History, and Government. One might have expected Marketing and Management to have been included in this category, particularly in the case of micro. While the contribution to a higher grade by marketing is slightly higher for micro than for macro, the opposite is true for management, and in neither case is the effect anything but minimal.

One additional puzzling effect is seen in the case of American History. For both macro and micro the correlation coefficient is positive. However, the relationship between having taken American History and grade is much stronger for macro than for micro. One might explain this by the idea that studying macro requires a better understanding of American government and other institutions than does the study of micro. If this was the explanation, however, one would expect to see the same situation with Government as with American History. Instead, a slightly higher correlation exists between having taken Government and grade in micro rather than for macro. Neither does number of students having taken American History seem to be the explanatory factor, since almost equal numbers of students in macro and micro had taken the course (about 160).

There is an obvious danger in putting too much faith in the correlation coefficients. As Table 2 indicated, fairly strong relationships exist between grades in principles and over-all grade point average, hours completed, age, and attitude toward economics. If, for instance, students with higher grade point averages had taken Accounting, then the high correlation between grade in

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economics and having taken Accounting might be caused by the sample of students rather than by any effect of taking Accounting. For this reason, both chi square tests and regression analysis were done for all classes with a correlation coefficient of over .10 for either macro grades or micro grades. The chi square results are presented in Table 4. In all cases, there were 8 degrees of freedom.

These results correspond closely with those from the correlation coefficients. Again, however, the effect of having taken a course, rather than that of a number of factors, is cannot be isolated.

Regression analysis results are presented in Table 5. Grade in economics was tested as the dependent variable and independent variables included grade point average, attitude toward economics, hours completed and age. In addition, experience with each of the classes was treated as a dummy independent variable, taking a value of 0 if the course had been taken previously and 1 if the course was being taken concurrently or had never been taken.

Table 5 indicates that, when other factors are held constant, very little effect on grade in economics comes from the number of college hours or age, while students with higher grade point averages or with more positive attitudes toward economics do significantly better, no matter what other courses they have taken. This result illustrates the danger of reaching conclusions from correlation coefficients or chi square statistics, where holding some variables constant while examining others is not possible.

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Table 4

Chi Square Results for Class and Grade

Class	Macro	Micro
Accounting	9.59(.60)	13.05(.90)
Computer Science	20.55(.99)	8.54(.65)
Micro/macro	7.06(.50)	15.31(.94)
English	8.3 (.60)	13.7 (.90)
College Algebra	20.09(.99)	5.17(.45)
Government	21.49(.99)	14.68(.92)
American History	10.38(.75)	10.19(.75)

TABLE 5
Regression Results for Grade by Class

	Hours	Age	GPA	Attitude	Class
Macro					
Accounting	0.049	0.027	-0.264*	0.114*	0.013
R^2=23.1	(0.55)	(0.35)	(-4.69)	(5.21)	(0.09)
Computer Science	0.081	0.001	-0.249*	0.112*	0.344*
R^2=24.5	(0.92)	(0.01)	(-4.42)	(5.14)	(1.94)
Micro	0.043	0.025	-0.264*	0.114*	-0.108
R^2=23.3	(0.49)	(0.33)	(-4.69)	(5.22)	(-0.45)
English	-0.030	-0.002	-0.334*	0.108*	-0.518*
R^2=25.9	(-0.34)	(-0.03)	(-5.52)	(4.98)	(-2.81)
College Algebra	0.068	0.019	-0.251*	0.106*	0.300*
R^2=24.5	(0.78)	(0.26)	(-4.47)	(4.79)	(1.95)
Government	0.070	0.029	-0.264*	0.114*	0.103
R^2=23.4	(0.76)	(0.39)	(-4.69)	(5.21)	(0.71)
History	0.032	0.022	-0.272*	0.114*	-0.084
R^2=23.4	(0.35)	(0.29)	(-4.67)	(5.22)	(-0.51)
Micro					
Accounting	-0.034	0.050	-0.260*	0.115*	0.070
R^2= 18.8	(-0.37)	(0.54	(-3.68)	(3.82)	(0.42)
Computer Science	-0.037	0.047	-0.262*	0.115*	0.049
R^2= 18.8	(-0.40)	(0.51)	(-3.72)	(3.82)	(0.27)
Macro	-0.037	0.050	-0.255*	0.116*	0.063
R^2= 18.8	(-0.41)	(0.54)	(-3.44)	(3.84)	(0.34)
English	-0.087	0.037	-.310*	0.110*	-0.356*
R^2= 19.6	(-0.92)	(0.40)	(-4.05)	(3.63)	(-1.51
College Algebra	-0.010	0.047	-0.263	0.115	0.021
R^2= 18.7	(-0.11)	(0.51)	(-3.73)	(3.79)	(0.12)
Government	-0.010	0.053	-0.255*	0.115*	0.161
R^2= 19.0	(-0.11)	(0.57)	(-3.61)	(3.83)	(0.85)
History	-0.071	0.048	-0.275*	0.112*	-0.168
R^2= 19.0	(-0.74)	(0.52)	(-3.84	(3.70)	(-0.89)

Coefficients are listed first, with t-statistics below in parentheses. Coefficients with asterisks are significantly different from zero at the .90 level.

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The effects of having taken various other classes on the final grade in economics is not, at least in most cases, too surprising. Accounting, computer science, college algebra, and government all have positive coefficients, indicating a positive effect on economics grade. For macro, only computer science and college algebra have significant for micro. The surprising result is that the coefficients for English and American History are both negative for micro and for macro, with the English coefficient being significantly negative at a .9 level for both. This result is puzzling.

V. Conclusions

The study of economics is relatively demanding, requiring either a strong positive attitude toward the subject or strong academic skills, although the two are, to some extent, interrelated. The study of some other areas seems to help in improving final grades in economics, particularly in macro. These other areas seem to consist primarily of areas where logical though processes are practiced.

Perhaps the strongest conclusion that can be reached from the information presented here is that this is a fruitful area for further research. Questions, of course, must be asked about the results which would be found if similar studies were done in areas related to economics. For instance, is having taken economics as beneficial to students in beginning accounting as the reverse? The building of curriculum, course prerequisites, and course levels could be vastly improved by further questioning along these lines.

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STUDENT SURVEY - EC 120

I am collecting information about students in EC 120 Classes. In particular, I am interested in factors which may have an effect on students' final grades in economics. If you are willing to participate in this project, please use the computer sheet to answer these questions. Also please sign the consent form below, giving me permission to have access to the final grade you receive in this course. Grades will be collected by student number to insure your privacy. Your decision about participating in this project will have no effect on your grade in this class.

I agree to allow my EC 120 instructor to give my final grade to Dr. Pauline Fox.

_____

Instructions: EC 120 Survey

Put your student number in the "Spaces for Student Number."

Fill in your section number under "Name of Test."

Answer these questions. Please read the instructions carefully.

1. What is your sex?

a. Male
b. Female

2. What is your major?

a. Business or economics
b. Some other major
c. Undecided about major

3. How many college hours had you completed before this semester?

a. None
b. 0-30
c. 31-60
d. 61-90
e. 91 or more

4. How old are you?

a. 18 or younger
b. 19-20
c. 21-22
d. 23-30
e. over 30

5. What was your GPA at the beginning of this semester?

a. I am a first semester freshmen.
b. 0-1.5
c. 1.5-2.25
d. 2.25-3.00
e. Over 3.00

For questions 6-9, use the following answers.

a. I strongly disagree.
b. I disagree.
c. I don't feel strongly either way
d. I agree.
e. I strongly agree.

6. Compared to other subjects, economics is boring.

7. Compared to other subjects, economics is hard.

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8. Compared to other subjects, economics is a waste of time.

9. Compared to other subjects, I find economics to be difficult but interesting.

10. Compared to other subjects, economics is easy.

For questions 11-21 use the following answers.

a. I have taken this course before this semester.
b. I am taking this course this semester.
c. I have never taken this course.

11. AC 131 Elementary Accounting I

12. CS 100 Fundamentals of Computer Science

13. EC 110 Macroeconomic Principles

14. EN 100 English Composition

15. MA 132 Intermediate Algebra

16. MA 134 College Algebra

17. MG 251 Fundamentals of Management

18. MK 241 Marketing

19. PL 101 Introductory Logic

20. PS 100 National and State Government

21. US 101 American History I